WTB12L-1H161820A00

W12

SMALL PHOTOELECTRIC SENSORS

SICK
Sensor Intelligence.

WTB12L-1H161820A00 | W12
SMALL PHOTOELECTRIC SENSORS

Illustration may differ

Ordering information

Type	Part no.
WTB12L-1H161820A00	1129940

Other models and accessories ➜ www.sick.com/W12

CE
ECOLAB®
IO-Link
c(UL)us LISTED
Ind. Con. Eq.
4R97
SIRIC®
optical ASIC
invented by SICK
UK CA

Detailed technical data

Features

Functional principle	Photoelectric proximity sensor
Functional principle detail	Background suppression
Sensing range	
Sensing range min.	15 mm
Sensing range max.	420 mm
Adjustable switching threshold for background suppression	30 mm … 420 mm
Reference object	Object with 90% remission factor (complies with standard white according to DIN 5033)
Minimum distance between set sensing range and background (black 6% / white 90%)	4 mm, at a distance of 140 mm
Recommended sensing range for the best performance	40 mm … 160 mm
Emitted beam	
Light source	Laser
Type of light	Visible red light
Shape of light spot	Ellipse shape
Light spot size (distance)	2.4 mm x 1 mm (160 mm)
Maximum dispersion of the emitted beam around the standardized transmission axis (squint angle)	< +/- 1.0° (at Ta = +23 °C)
Key laser figures	
Normative reference	EN 60825-1:2014, IEC 60825-1:2014

Laser class	1
Wave length	655 nm
Pulse duration	4 µs
Maximum pulse power	< 4.03 mW
Average service life	50,000 h at T_U = +25 °C

Smallest detectable object (MDO) typ.	
	3 mm (at 160 mm distance)
	Object with 90% remission factor (complies with standard white according to DIN 5033)

Adjustment	
Teach-Turn adjustment	BluePilot: For setting the sensing range
IO-Link	For configuring the sensor parameters and Smart Task functions

Indication	
LED blue	BluePilot: sensing range indicator
LED green	Operating indicator Static on: power on Flashing: IO-Link mode
LED yellow	Status of received light beam Static on: object present Static off: object not present

Special applications	Detecting small objects, Detection of objects moving at high speeds, Detecting perforated objects

Safety-related parameters

$MTTF_D$	280 years
DC_{avg}	0 %
T_M (mission time)	10 years (EN ISO 13849, rate of use: 60 %)

Communication interface

IO-Link	✔, IO-Link V1.1
Data transmission rate	COM2 (38,4 kBaud)
Cycle time	2.3 ms
Process data length	16 Bit
Process data structure	Bit 0 = switching signal Q_{L1} Bit 1 = switching signal Q_{L2} Bit 2 ... 15 = Current receiver level (live)
VendorID	26
DeviceID HEX	0x8002D6
DeviceID DEC	8389334
Compatible master port type	A
SIO mode support	Yes

Electronics

Supply voltage U_B	10 V DC ... 30 V DC [1]
Ripple	≤ 5 V

[1] Limit values.

[2] Signal transit time with resistive load in switching mode.

[3] With light/dark ratio 1:1.

[4] This switching output must not be connected to another output.

WTB12L-1H161820A00 | W12
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Usage category	DC-12 (According to EN 60947-5-2) DC-13 (According to EN 60947-5-2)
Current consumption	≤ 14 mA, without load. At U_B = 24 V
Protection class	III
Digital output	
Number	2 (Complementary)
Type	Push-pull: PNP/NPN
Switching mode	Light/dark switching
Signal voltage PNP HIGH/LOW	Approx. U_B-2.5 V / 0 V
Signal voltage NPN HIGH/LOW	Approx. U_B / < 2.5 V
Output current $I_{max.}$	≤ 100 mA
Circuit protection outputs	Reverse polarity protected Overcurrent protected Short-circuit protected
Response time	≤ 200 µs [2]
Repeatability (response time)	85 µs [2]
Switching frequency	2,500 Hz [3]
Pin/Wire assignment	
BN	+ (L+)
WH	$\bar{Q}_{L1}$/MF Digital output, dark switching, object present → output $\bar{Q}_{L1}$ LOW [4] The pin 2 function of the sensor can be configuredAdditional possible settings via IO-Link
BU	- (M)
BK	QL1/C Digital output, light switching, object present → output Q_{L1} HIGHIO-Link communication C [4] The pin 4 function of the sensor can be configuredAdditional possible settings via IO-Link

[1] Limit values.

[2] Signal transit time with resistive load in switching mode.

[3] With light/dark ratio 1:1.

[4] This switching output must not be connected to another output.

Mechanics

Housing	Rectangular
Dimensions (W x H x D)	15.6 mm x 49.5 mm x 43.1 mm
Connection	Cable, 4-wire, 2 m
Connection detail	
Deep-freeze property	Do not bend below 0 °C
Conductor size	0.14 mm²
Cable diameter	Ø 3.4 mm
Length of cable (L)	2 m
Bending radius	For flexible use > 12 x cable diameter
Bending cycles	1,000,000
Material	
Housing	Metal, zinc diecast
Front screen	Plastic, PMMA
Cable	Plastic, PVC

Weight	Approx. 132 g
Maximum tightening torque of the fixing screws	1.4 Nm

Ambient data

Enclosure rating	IP66 (EN 60529) IP67 (EN 60529) IP69 (EN 60529)
Ambient operating temperature	–20 °C ... +55 °C
Ambient temperature, storage	–40 °C ... +70 °C
Warm-up time	< 15 min, Where T_u is under –10 °C
Typ. Ambient light immunity	Artificial light: ≤ 50,000 lx Sunlight: ≤ 50,000 lx
Shock resistance	50 g, 11 ms (25 positive and 25 negative shocks along X, Y, Z axes, 150 total shocks (EN60068-2-27))
Vibration resistance	10 Hz ... 2,000 Hz (Amplitude 0.5 mm / 10 g, 20 sweeps per axis, for X, Y, Z axes, 1 octave/min, (EN60068-2-6))
Air humidity	35 % ... 95 %, relative humidity (no condensation)
Electromagnetic compatibility (EMC)	EN 60947-5-2
Resistance to cleaning agent	ECOLAB
UL File No.	NRKH.E181493 & NRKH7.E181493

Smart Task

Smart Task name	Base logics
Logic function	Direct AND OR
Timer function	Deactivated Switch-on delay Off delay ON and OFF delay Impulse (one shot)
Inverter	Yes
Switching frequency	SIO Logic: 2000 Hz [1] IOL: 1600 Hz [2]
Response time	SIO Logic: 250 µs [1] IOL: 300 µs [2]
Repeatability	SIO Logic: 120 µs [1] [2]
Switching signal	
Switching signal Q_{L1}	Switching output
Switching signal $\bar{Q}_{L1}$	Switching output

[1] Use of Smart Task functions without IO-Link communication (SIO mode).
[2] Use of Smart Task functions with IO-Link communication function.

Diagnosis

| Device temperature	
Measuring range	Very cold, cold, moderate, warm, hot
Device status	Yes
Detailed device status	Yes

Operating hour counter	Yes
Operating hours counter with reset function	Yes
Quality of teach	Yes

Classifications

|	
ECLASS 5.0	27270904
ECLASS 5.1.4	27270904
ECLASS 6.0	27270904
ECLASS 6.2	27270904
ECLASS 7.0	27270904
ECLASS 8.0	27270904
ECLASS 8.1	27270904
ECLASS 9.0	27270904
ECLASS 10.0	27270904
ECLASS 11.0	27270904
ECLASS 12.0	27270903
ETIM 5.0	EC002719
ETIM 6.0	EC002719
ETIM 7.0	EC002719
ETIM 8.0	EC002719
UNSPSC 16.0901	39121528

Adjustments

Display and adjustment elements

① LED blue
② Teach-Turn adjustment
③ LED green
④ LED yellow
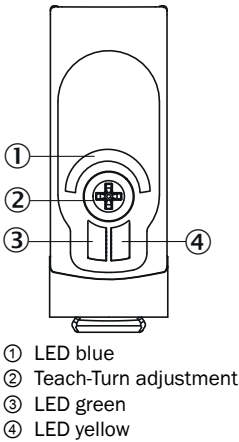
Connection type

Cable, 4-wire
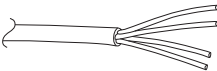
Truth table

Push-pull: PNP/NPN - light switching Q

	Light switching Q (normally open (upper switch), normally closed (lower switch))	
	Object not present ➔ Output LOW	Object present ➔ Output HIGH
Light receive	⊗	✓
Light receive indicator	⊗	☀
Load resistance to L+	⚡	⊗
Load resistance to M	⊗	⚡

Push-pull: PNP/NPN – dark switching Q̄

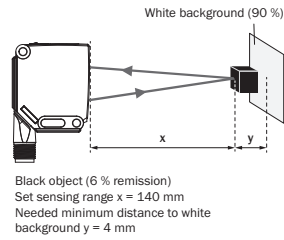|	Dark switching Q̄ (normally closed (upper switch), normally open (lower switch))	
	Object not present ➔ Output HIGH	Object present ➔ Output LOW
Light receive	⊗	✓
Light receive indicator	⊗	☀
Load resistance to L+	⊗	⚡
Load resistance to M	⚡	⊗

Characteristic curve

Minimum distance in mm (y) between the set sensing range and white background (90 % remission)
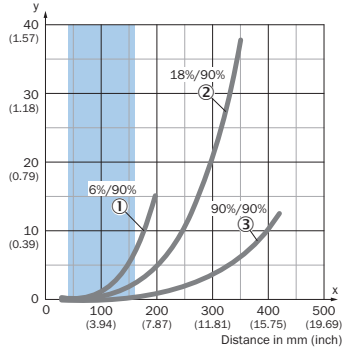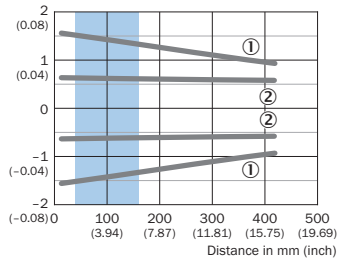

Example:
Safe suppression of the background

White background (90 %)

Black object (6 % remission)
Set sensing range x = 140 mm
Needed minimum distance to white background y = 4 mm

▮ Recommended sensing range for the best performance

① Black object, 6% remission factor
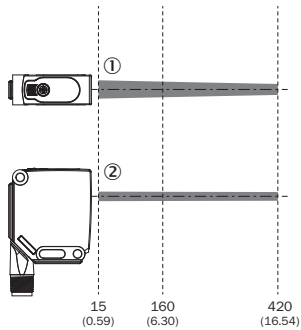② Gray object, 18% remission factor
③ White object, 90% remission factor

Light spot size

Dimensions in mm (inch)

▮ Recommended sensing range for the best performance

① Light spot horizontal
② Light spot vertical

15 (0.59) 160 (6.30) 420 (16.54)

Sensing range diagram
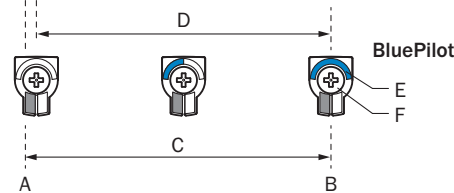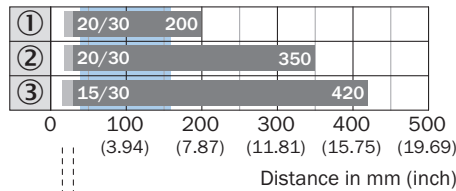
①	20/30	200
②	20/30	350
③	15/30	420

Distance in mm (inch)

BluePilot

▮ Recommended sensing range for the best performance

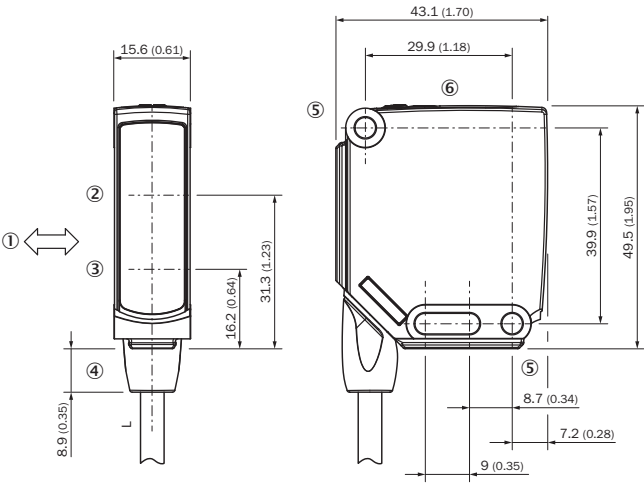|	
1	Black object, 6% remission factor
2	Gray object, 18% remission factor
3	White object, 90% remission factor
A	Sensing range min. in mm
B	Sensing range max. in mm
C	Field of view
D	Adjustable switching threshold for background suppression
E	Sensing range indicator
F	Teach-Turn adjustment

Dimensional drawing (Dimensions in mm (inch))

Dimensional drawing, sensor

For length of cable (L), see technical data
① Standard direction of the material being detected
② Center of optical axis, receiver
③ Center of optical axis, sender
④ Connection
⑤ Mounting hole, Ø 4.2 mm
⑥ Display and adjustment elements

Recommended accessories

Other models and accessories ➜ www.sick.com/W12

	Brief description	Type	Part no.
Mounting brackets and plates			
	• **Material:** Aluminum • **Details:** Aluminum • **Items supplied:** Including mounting material (sensor) and mounting material (bracket) • **Usable for:** Adapter plate for W23L/W27L to W12L	BEF-AP-W12	2127742

	Brief description	Type	Part no.
	• **Description:** Mounting bracket, large • **Material:** Stainless steel • **Details:** Stainless steel • **Items supplied:** Mounting hardware included • **Suitable for:** W11-2, W12-3, W16	BEF-WG-W12	2013942
Terminal and alignment brackets			
	• **Description:** Clamping block for dovetail mounting • **Material:** Aluminum • **Details:** Aluminum (anodised) • **Items supplied:** Mounting hardware included • **Suitable for:** W11-2, W12-3	BEF-KH-W12	2013285
Universal bar clamp systems			
	• **Description:** Plate N03 for universal clamp bracket, zinc coated • **Material:** Steel, zinc diecast • **Details:** Zinc plated steel (sheet), Zinc die cast (clamping bracket) • **Items supplied:** Universal clamp (5322626), mounting hardware • **Usable for:** UC12, W14-2, W18-2, W18-3, W11-2, W12-3, W12-2 Laser, W12G, W12 Teflon, W16, W24-2 Ex, PowerProx, W11G-2, TranspaTect, W18-3 Ex, W24-2, PL50A, PL80A, PL40A, P250	BEF-KHS-N03	2051609
	• **Description:** Mounting bar, straight, 300 mm, steel • **Material:** Steel • **Details:** Steel, zinc coated • **Items supplied:** Without mounting hardware • **Usable for:** Fiber-optic sensors	BEF-MS12G-B	4056055
	• **Description:** Bar clamp for bar diameter of 12 mm (fixing the mounting rod) • **Material:** Aluminum • **Details:** Aluminum • **Items supplied:** 2 screws M6 x 30, 2 spring discs • **Usable for:** Fiber-optic sensors	BEF-RMC-D12	5321878
Others			
	• **Connection type head A:** Male connector, M12, 4-pin, straight, A-coded • **Description:** Unshielded • **Connection systems:** Screw-type terminals • **Permitted cross-section:** ≤ 0.75 mm²	STE-1204-G	6009932
	• **Connection type head A:** Male connector, M12, 4-pin, straight, A-coded • **Connection systems:** Cutting technology • **Permitted cross-section:** 0.14 mm² ... 0.34 mm² • **Note:** Test voltage 1.25 kV eff/60 s, insulation group C to VDE 0110, for field bus technology	STE-1204-GQU6	6042089
	• **Connection type head A:** Male connector, M12, 4-pin, straight, A-coded • **Description:** Unshielded • **Connection systems:** Cutting technology • **Permitted cross-section:** 0.34 mm² ... 0.75 mm²	STE-1204-GQU8	6044998
	• **Connection type head A:** Male connector, M12, 4-pin, angled, A-coded • **Description:** Unshielded • **Connection systems:** Screw-type terminals • **Permitted cross-section:** ≤ 0.75 mm²	STE-1204-W	6022084
	• **Connection type head A:** Female connector, M12, 4-pin, straight, A-coded • **Description:** Unshielded, Head A: female connector, M12, 4-pin, straight, unshielded, for power supply, for cable diameter 4 mm ... 6 mm Head B: - • **Connection systems:** Screw-type terminals • **Permitted cross-section:** ≤ 0.75 mm²	DOS-1204-G	6007302
	• **Connection type head A:** Female connector, M12, 4-pin, straight, A-coded • **Description:** Unshielded • **Connection systems:** Screw-type terminals • **Permitted cross-section:** ≤ 0.75 mm²	DOS-1204-GX	6026528

	Brief description	Type	Part no.
	• **Connection type head A:** Female connector, M12, 4-pin, straight, A-coded • **Description:** Unshielded • **Connection systems:** Cutting technology • **Permitted cross-section:** 0.14 mm² ... 0.34 mm²	DOS-1204-GQU6	6042088
	• **Connection type head A:** Female connector, M12, 4-pin, straight, A-coded • **Description:** Unshielded • **Connection systems:** Cutting technology • **Permitted cross-section:** 0.34 mm² ... 0.75 mm²	DOS-1204-GQU8	6053328
	• **Connection type head A:** Female connector, M12, 4-pin, angled, A-coded • **Description:** Unshielded, Head A: female connector, M12, 4-pin, angled, unshielded, for power supply, for cable diameter 3 mm ... 6.5 mm Head B: - • **Connection systems:** Screw-type terminals • **Permitted cross-section:** ≤ 0.75 mm²	DOS-1204-W	6007303
	• **Connection type head A:** Female connector, M12, 4-pin, angled, A-coded • **Description:** Unshielded • **Connection systems:** Screw-type terminals • **Permitted cross-section:** ≤ 0.75 mm²	DOS-1204-WX	6025570
Sensor Integration Gateway			
	• **Further functions:** Web server integrated, IIoT interface available (dual talk) • **Logic editor:** no • **Communication interface:** IO-Link, Ethernet, PROFINET, REST API, MQTT, OPC UA • **Product category:** IO-Link Master	SIG350-0004AP100	6076871

SICK AT A GLANCE

SICK is one of the leading manufacturers of intelligent sensors and sensor solutions for industrial applications. A unique range of products and services creates the perfect basis for controlling processes securely and efficiently, protecting individuals from accidents and preventing damage to the environment.

We have extensive experience in a wide range of industries and understand their processes and requirements. With intelligent sensors, we can deliver exactly what our customers need. In application centers in Europe, Asia and North America, system solutions are tested and optimized in accordance with customer specifications. All this makes us a reliable supplier and development partner.

Comprehensive services complete our offering: SICK LifeTime Services provide support throughout the machine life cycle and ensure safety and productivity.

For us, that is "Sensor Intelligence."

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